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Circular Letters:

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Acute Abdominal Emergencies: A logical method is presented for organizing one's thinking when confronted with an acute abdominal emergency in the hope that earlier, correct diagnoses may be facilitated. It is suggested that the entire subject of the acute condition of the abdomen be approached by concentrating on the general symptoms of pain, vomiting, and bowel changes in taking the history. The topic of pain is subdivided into onset and location, determining whether the onset is sudden or insidious. Also evaluated is the distribution of pain for colic locations, top of shoulder, and referred cutaneous hyperesthesia. Vomiting can be related to severe irritation of the nerves of the peritoneum or mesentery, obstruction of an involuntary muscle tube, or action of absorbed toxins upon the medullary centers. A correlation to one of these mechanisms can usually be made.

The evaluation of bowel changes must include a stethoscopic examination for increase, decrease, or absence of peristaltic sounds. A history should be taken for bloody and tarry stools or diarrhea with hypogastric pain and tenderness. An outline for evaluating acute abdominal emergencies follows:

GENERAL SYMPTOMS OF AN ACUTE CONDITION OF ABDOMEN

Pain

I. Onset
- A. Sudden
  - 1. Producing syncope
    - (a) Men: Acute pancreatitis
      Ruptured peptic ulcer
    - (b) Women: Also ruptured ectopic gestation
  - 2. Not producing syncope
    - (a) Colics (in tube structures and stomach associated with restlessness)
      - Intestinal
      - Biliary
      - Ureterorenal
      - Uterine-tubal
      - Pancreatic
    - (b) Hemorrhage
      - Spleen
      - Liver
      - Intestines
      - Kidneys
      - Cysts (ovarian, pancreatic, mesenteric, etc.)
      - Bladder
      - Ruptured Aneurism (syncope from shock)
    - (c) Emboli, thrombosis and infarction
      - Mesentery
      - Spleen
      - Liver
      - Iliac vessels
- B. Insidious
  - 1. Inflammatory lesions
    - (a) Becoming obstructive
      - Appendicitis
      - Cholecystitis
      - Acute hydronephrosis or pyelitis
      - Salpingitis
      - Pyometritis
      - Stenosing duodenal ulcer
      - Diverticulitis (Meckel's or colon)
      - Regional ileitis
    - (b) Not obstructive
      - Acute gastroenteritis
      - Ulcerative colitis
      - Mesenteric lymphadenitis
      - Acute cystitis
      - Pancreatitis
      - Peritonitis (chemical or infectious)

      (Movement increases pain)
  - 2. Neoplasms
  - 3. Post-trauma
  - 4. Abscesses

II. Location of Pain
- A. Usually over the affected organ
- B. Radiation to top of shoulder (either supraspinous fossa, over acromion, over clavicle or in subclavicular fossa)
  - 1. Cholelithiasis (radiating from right subscapular area)
  - 2. Ruptured spleen (left)
  - 3. Subphrenic abscess
  - 4. Perforated peptic ulcer
  - 5. Diaphragmatic pleurisy

* From the Department of Surgery, Loyola University School of Medicine and Mercy Hospital, Chicago, Ill.

6. Acute pancreatitis (radiates from midline back)
7. Liver abscess
8. Appendicitis with generalized peritonitis

C. Colics
1. Small intestinal
Epigastric and umbilical (T_9 to T_{11})
2. Large intestinal
Hypogastric (T_{11} to L_1)
3. Biliary
Right subcostal at midclavicular line radiating to subscapular (T_8)
4. Renal
Loin, radiating to corresponding testicle (L_1, L_2)

D. Referred cutaneous hyperesthesia
1. Present in one-half the cases of acute abdominal condition
2. May be referred to skin level of same spinal nerve innervating the pathologic organ (e.g., cutaneous level of hyperesthesia, associated with visceral peritoneal irritation of appendicitis)

Vomiting

Causes
1. Severe irritation of the nerves of the peritoneum or mesentery
Examples:
(a) Perforated peptic ulcer (irritation of peritoneum)
(b) Acute pancreatitis (reflex stimulation of coeliac plexus)
(c) Twisted ovarian cyst or strangulated bowel (sympathetic nerve stimulation)
2. Obstruction of an involuntary muscle tube
Examples:
(a) Biliary ducts
(b) Ureter
(c) Uterine canal
(d) Intestine
3. Action of absorbed toxins upon the medullary centers

Bowel Changes

1. Peristaltic sounds usually decreased or absent, with obstipation
(a) Peritonitis (paralytic ileus)
(b) Intra-abdominal hemorrhage
2. Peristaltic sounds usually increased, without diarrhea
(a) Mechanical obstruction (tinkles and rushes sometimes audible)
3. Peristaltic sounds usually increased, with diarrhea
(a) Acute gastroenteritis
(b) Dysenteries
4. Hypogastric pain and diarrhea followed by hypogastric tenderness and constipation are suspicious of a pelvic abscess and/or pelvic appendicitis
5. Bloody or tarry stools with acute abdomen indicate intragastrointestinal hemorrhage

CONDITIONS REQUIRING EMERGENCY SURGERY

I. Acute Trauma
A. Non-penetrating
1. Severe crushes
2. Sharp, circumscribed blow (falls, animal kicks, etc.)
3. Tear of visceral attachments or organ capsules (spleen, liver, kidney, intestines)
B. Penetrating (stab, gunshot, pitchfork, etc.)
1. Pneumothorax or hemopneumothorax must be differentiated
2. Wounds of entrance and exit in intestinal tract must be located unless missile is in lumen.

II. Acute Appendicitis
III. Ruptured Peptic Ulcer
IV. Acute Mechanical Bowel Obstruction
A. Strangulated hernia
B. Adhesions
C. Carcinoma
D. Intussusception
E. Volvulus
F. Gallstone or foreign body[3]
G. Regional ileitis (rarely)
V. Ruptured Ectopic Pregnancy
VI. Twisted (or Hemorrhage into) Ovarian Cyst
VII. Mesenteric Thrombosis
III. Abscesses
A. Subdiaphragmatic
B. Diverticular
C. Liver
D. Appendiceal
E. Pelvic
IX. Ruptured Intestinal Ulcers (Typhoid, Amebic, etc.) or Persistent Hemorrhaging Gastrointestinal Ulcers
X. Ruptured Gallbladder
XI. Emboli of Iliac Arteries

MEDICAL CONDITIONS SIMULATING ACUTE ABDOMINAL EMERGENCIES

1. Pneumonia and or diaphragmatic pleurisy
2. Acute gastroenteritis (food poisoning)
3. Mesenteric lymphadenitis (children)
4. Acute cardiac conditions
   (a) Coronary occlusion
   (b) Angina pectoris
   (c) Cardiac failure with congested liver
   (d) Acute pericarditis
5. Acute pancreatitis
6. Ruptured corpus hemorrhagicum
7. Mittelschmerz
8. Tabetic crisis
9. Lead poisoning
10. Aneurysm, dissecting or fusiform
11. Hepatitis
12. Influenza
13. Periarteritis nodosum
14. Tuberculous peritonitis
15. Typhoid fever
16. Diabetes mellitus (impending coma)
17. Abdominal allergy
18. Malaria
19. Other conditions include
    Interstitial nephritis
    Pyonephrosis
    Hemolytic jaundice
    Acute osteomyelitis of dorsal or lumbar vertebra
    Pott's disease in children
    Herpes zoster
    Henoch's purpura
    Sickle cell anemia
    Splenomedullary leukemia
    Subarachnoid hemorrhage
    Acute porphyria and others

Comments. It is important to stress that the colics are produced by distention of obstructed tube structures (with fluid or gas) causing paroxysms of excruciating pain so that the patient writhes and doubles up. This picture is in sharp contrast to peritonitis, in which the patient desires to lie quietly, as any motion of the abdomen produces increased pain.

Concerning the onset of pain in hemorrhage into the spleen, it should be remembered that the pain may be delayed as long as several days following trauma to the abdomen. For example, a "splenic cake" may form following a ruptured spleen with vague symptoms. The sudden onset of severe pain may then begin when intra-abdominal bleeding recurs as partial separation of the "splenic cake" occurs. In the authors' experience the delayed onset of pain is nevertheless still sudden, although it may conceivably be of the insidious type (as has been indicated under the post-trauma heading in the outline).

Regional ileitis is not considered to be an acute surgical emergency even though it has a phase producing partial mechanical bowel obstruction among its 4 progressive stages, i. e., simulating appendicitis, simulating ulcerative colitis, mechanical obstruction, and formation of fistulas. Because it will occasionally be diagnosed inadvertently as an acute appendicitis and not be discovered until operation, the treatment of closing the abdomen and doing elective surgery at a quiescent stage is recommended. In case an operation is inadvertently performed upon a patient with an acute pancreatitis (usually avoidable by thinking of the diagnosis and taking a serum amylase as soon as possible after the onset of pain), the authors' policy has been to drain the lesser peritoneal sac only and not to perform even a cholecystostomy. It is their belief that the less surgery performed, the better the patient's prognosis.

In the diagnosis of acute appendicitis the eliciting of a history for the sensation of "gas stoppage" at the very onset of the attack is recommended as useful. This concept was reported by Keyes and merely involves routinely asking the patient the following 3 questions: "At the onset of this attack did you have a sensation of gas stoppage in your bowels?" "Did you feel if you could pass gas that you would be relieved?" "Were you relieved when you were able to pass gas through your rectum?" A patient with acute appendicitis presumably answers the first 2 questions in the affirmative and the third in the negative. The authors have found that it is indeed true for the majority of their patients, and think it worth remembering in the taking of the history. However, there are always a few cases in which these symptoms will not be present as indicated; they cannot therefore be considered to be pathognomonic. The diagnosis of acute appendicitis can at times be the most difficult one to make preoperatively in surgery.

It is very helpful when operating upon a patient with ruptured peptic ulcer to have the patient swallow one grain of methylene blue preoperatively. The presence of the dye in the free peritoneal fluid immediately assures the surgeon of the correctness of the diagnosis. Furthermore, on one occasion the dye permitted the authors to localize an ulcer on the dorsal (retroperitoneal) portion of the duodenum that otherwise might easily have been missed.

Among the medical conditions simulating an acute surgical abdomen, mesenteric lymphadenitis in children is often most difficult to distinguish from acute appendicitis. Most surgeons know by experience that this disease usually improves following removal of the appendix. There have been occasions when the authors have removed an appendix in the face of a presumptive diagnosis of mesenteric lymphadenitis, with persistent, severe, intermittent attacks, especially when a mental hazard existed in the minds of the parents and the doctor that one of these many attacks might really have been appendicitis, and a ruptured appendix might then have resulted from conservative treatment. This method of management in all cases has been chosen and approved by the parents (although in many cases it has not been more than a prophylactic appendectomy) and has frequently been followed by complete relief of symptoms.

Conclusion. The following general axioms are well worth remembering in acute abdominal emergencies:

1. Severe abdominal pain of 6 hours' duration in a previously well patient usually indicates surgical intervention.
2. If any patient with abdominal pain is found to have a temperature of 104° to 105° F. at the onset of illness, the thorax or kidney is very likely the seat of the disease.
3. A normal pulse does not necessarily indicate a normal condition of the abdomen, especially in the early stages of an abdominal emergency.
4. Irritation of the pelvic nerves causes no abdominal wall rigidity.

5. Movement and pressure increase pain in peritonitis but afford some measure of relief in colic.

6. The stethoscope is as important in surgery for abdominal auscultation as it is in internal medicine for chest auscultation. (Am. J. Surg., July '50, A. M. Vaughn et al.)

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Comparison of Scopolamine Hydrobromide and Dramamine in the Treatment and Prevention of Airsickness: Previous studies have shown the value of scopolamine hydrobromide in the prevention and treatment of airsickness, and of dramamine in the prevention of seasickness. This study was conducted to determine the effectiveness of dramamine in cases of airsickness, with scopolamine hydrobromide as a criterion. Scopolamine was used in place of a placebo control, because its effectiveness in control of motion sickness seems to have been generally demonstrated and accepted. One hundred students suffering from airsickness during flight training were used as subjects.

Two forms of medication were prepared in capsule form with coloring added to render both types of capsule the same in appearance. The contents were as follows:

Capsule #1	Scopolamine Hydrobromide	0.6 mg.
	Beta Lactose	135 mg.
	Lycopodium	200 mg.
Capsule #2	Dramamine*	100 mg.
	Beta Lactose	85 mg.

* The dramamine was obtained from 100 mg. tablets powdered for use in the capsule form.

Every student who reported either voluntarily or as a result of instructor referral was given 3 capsules, either #1 or #2, but never mixed. Students were treated in the order in which they arrived without regard to age, stage of flight training, or previous history, until complete records on 100 had been accumulated, 50 (the criterion group) having received scopolamine treatment and 50 (the experimental group) dramamine. Insofar as feasible, the two types of capsule were alternated between the students as they appeared. In no case was a subject permitted to discover what medication was being used.

The patient was interviewed and given 3 capsules of one type. He was told to take one 30 minutes prior to each of his next three training flights and then to report the efficacy of the treatment to the flight surgeon. In the event that the student did not report as scheduled, the flight surgeon called him for a report. If the patient reported that the treatment had been entirely successful and that

he had suffered no airsickness in flight following administration of the prescribed capsule, he was encouraged to fly without medication, but to return if his airsickness recurred. If airsickness recurred or a student felt that he still needed medication, he was given 3 more capsules of the same kind that he had previously had, and the same routine was repeated. This procedure was continued until either the student was dropped from flight training or he was able to fly without further medication and without further airsickness.

If a student who had received treatment was dropped from flight training for reasons of continued airsickness or in any case in which airsickness appeared to play a part in the final decision to drop the student from the training program, the use of the medication was classed as a failure. Two students who continued to be airsick in spite of medication, but who were still in the training program at the end of the experimental period were also counted as failures. If a student who had received treatment, and who had appeared to have overcome the difficulty and thus stopped treatment, later returned to report a recurrence of his trouble, his case was classed as a relapse, and treatment with the same type of capsule was reinstituted. A student was considered to have been successfully treated if he had received treatment, discontinued it, and did not have a recurrence of his airsickness prior to completing his basic training.

Data treated statistically included information obtained in the initial interview. Records were kept of the patient's rank, age, his previous experiences with motion sickness (carsickness, swing sickness, airsickness, and seasickness), previous flight experience and sea duty, his first training flight in which airsickness occurred, the first training flight under treatment, the total number of treatments, which capsule was administered, and relapses, successful treatments, and failures. Note was also made of all reports of undesirable side effects of the medication.

The results of this study, given in table I, indicate that the 3 student groups (midshipmen, student officers, and naval aviation cadets) responded to treatment in similar manner. Consideration of this data reveals no evidence that either drug is superior to the other.

Table I

Successes and failures under each type of treatment shown according to student classification

Student classification	Criterion group (Scopolamine treated)					Experimental group (Dramamine treated)				
	Successes		Failures		Total	Successes		Failures		Total
	N	%	N	%	N	N	%	N	%	N
Midshipmen	33	89.2	4	10.8	37	17	94.4	1	5.6	18
Student Officers	9	90.0	1	10.0	10	17	89.5	2	10.5	19
Naval Aviation Cadets	3	100.0	0	0.0	3	12	92.3	1	7.7	13
Total	45	90.0	5	10.0	50	46	92.0	4	8.0	50

Table II shows the number and percent of each group classed as relapses.

Table II

Incidence of relapses among students classified as successes

Student classification	Criterion group (Scopolamine treated)			Experimental group (Dramamine treated)		
	All Successes N	Relapses N	%	All Successes N	Relapses N	%
Midshipmen	33	9	27.2	17	4	23.5
Student Officers	9	4	44.4	17	1	5.9
Naval Aviation Cadets	3	0	0.0	12	0	0.0
Total	45	13	28.9	46	5	10.9

There were more instances of previous airsickness, seasickness, and motion sickness of other types in the group given dramamine. Because of this, one would predict that the dramamine group would have more relapses than the other group, even if they were to respond as readily to the drug used. Actually, as shown in table I, they responded as well initially as the scopolamine group, and their relapses were significantly fewer (table II).

The number of flights intervening between each subject's first airsick flight and his flight under treatment was studied. Fifty percent of the scopolamine cases received treatment immediately following the first flight on which they were airsick. Only 32 percent of the dramamine group were so promptly treated. Furthermore, 86 percent of the scopolamine group were treated with not more than 4 flights intervening between the first airsick flight and the first flight under treatment as compared to 82 percent of the dramamine group. If prompt treatment were important, here again the scopolamine group would appear to have had the advantage.

The length of time treatment was carried on is indicated by the number of capsules consumed. In both groups exactly 50 percent of the students used 6 or less capsules (median = 6.5). The mean number of capsules used was: criterion group, 8.3; experimental group, 7.4.

A record was kept of all undesirable side effects reported by patients. Among those taking scopolamine, 2 complained of dryness, 1 complained of dryness and drowsiness, and 3 complained of some feelings of grogginess. Of these 6 (12 percent of the group), none found the ill effects serious enough to discontinue treatment.

Among those using dramamine, 1 complained of drowsiness but continued the medication; another, however, stopped the medication of his own accord after the first dose made him very sleepy. He was not airsick thereafter. These 2 (4 percent of their group) are the only ones reporting side effects from the dramamine.

Consideration of the results presented in tables I and II leads to the conclusion that under the conditions of this study, the 2 drugs used were equally effective in the prevention of airsickness and in the ultimate cure of airsickness in those treated. In the case of the experimental (dramamine-treated) subjects, there were significantly fewer who relapsed before cure was effected. The number of successes and failures according to the student classification of the subjects shows no real difference in the manner in which the 3 student groups responded to treatment. It is interesting to note, however, that the naval aviation cadets showed no relapses out of 15 treated, whereas 28 percent of the midshipmen and 23 percent of the student officers showed relapses. Because 80 percent of the naval aviation cadets were in the dramamine groups, it appears that weight of their presence could account for the apparent superiority of dramamine so far as relapses are concerned. If the NavCad group is completely eliminated, the difference in the number of relapses in the 2 groups becomes statistically insignificant.

Consideration of other factors revealed in the data at hand proves barren so far as clues to this difference in relapses is concerned. A study of the background factors in the 2 populations shows some differences. The average age of the 2 groups is close, and the number of those with previous sea duty is identical in the two populations. However, the experimental groups contained a higher percentage of those who had had previous flying experience. This fact may explain somewhat why this group also had a higher percentage of subjects who had had previous trouble with airsickness. Remaining unexplained by this data on background is the additional fact that this group also had a higher percentage of those reporting previous seasickness and motion sickness of other types.

It may be stated that under the conditions of this study, scopolamine and dramamine were found to be equally effective in the prevention and ultimate cure of airsickness. Side effects reported were few, mild, and similar for both types of medication. Reports of dryness, drowsiness, and grogginess in some cases suggest that possibly the size of the dose used should vary with the individual concerned. In future studies, the problem of the size of dose

necessary for beneficial results might well be investigated. A comparison of the relative merits of these 2 drugs in preventing airsickness on long flights should also be made. Furthermore, studies of the psychological effects of these drugs as they affect performance in the pilot would seem to be advisable before any extensive use of them is made by men in actual control of aircraft. (Proj. No. NM 001 059.17.01, 15 April '50, NavSchol Med., NAS, Pensacola, Fla., J. D. Boland and A. D. Grinsted.)

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An Unusual Sensitivity Reaction to Penicillin: Since the time that penicillin came into general clinical use, a wide variety of sensitivity reactions have been seen. Earlier reports were of reactions to aqueous penicillin, but Rosellini and van Rooy and more recently Burt and Caplan have reported delayed reactions to penicillin given in oil and wax. However, in neither of these cases is there any direct evidence that the vehicle was responsible, although the patient described by Burt and Caplan was sensitive to ragweed and the authors suggest the possibility that the beeswax contained a pollen antigen.

In spite of many reactions to it, only 4 deaths attributable to penicillin were reported prior to the death of the patient herein recorded. In 2 of these cases other causes of death could not definitely be ruled out, because in one a febrile course terminated fatally 9 days after an abdominal operation for carcinoma, and in the other, the patient was also suffering from a streptococcal septicemia. The 3d case appears to have been one of anaphylactic shock and death following, by a few seconds, an intravenous injection of penicillin. The 4th was a case of exfoliative dermatitis with angioneurotic edema, fever, and abdominal pain and distention ending fatally 13 days after onset of the toxic reaction which closely resembled the one reported below. In none of these 4 cases was a postmortem examination performed.

The following case history illustrates many of the signs and symptoms of hypersensitivity previously described in penicillin reactions.

A 53-year-old Italian storekeeper entered the hospital on October 26, 1947, because of a severe exfoliative dermatitis and extensive purpura. On October 9 the patient had had fever and malaise, diagnosed as "grippe"; however, on the following day he had a cough productive of rusty sputum, pain in the left side of the chest and signs of pneumonia over the left lower lobe. His physician gave him sulfadiazine, 1 gm. every 4 hours, as well as an intramuscular injection of 300,000 units of penicillin in oil and wax. On October 11 the temperature was 103.6°F., and a pin-point, erythematous rash was noted over the abdomen, arms and legs. This was thought to be due to the sulfadiazine, which was discontinued, and the patient was given another 300,000 units of penicillin in oil and wax intramuscularly. On October 12 the fever was still present, and the rash had become worse. In addition, bullae over the entire body and puffiness of the face had developed. The cough was unchanged but respiration became wheezing in character. By the next day many of the bullae had ruptured, discharging yellow fluid, and the temperature remained elevated. He was then treated with Pyribenzamine and ephedrine, with rapid clearing of the skin lesions, so that by October 18 the skin was completely normal. However, the fever and signs of pneumonia persisted, and he was given a third intramuscular injection of 300,000 units of penicillin in oil and wax. On the next day the generalized erythematous eruption reappeared, as did the bullae, which coalesced and ruptured, leaving painful red areas. In addition, there was marked edema of the face, hands and feet. The patient was seen the next day by another physician, who noted swelling of the entire body (most marked of the hands, lips and eyelids), extensive exfoliative dermatitis and severe asthmatic wheezes. Treatment with epinephrine, ephedrine, Pyribenzamine and calcium was then begun, with slight improvement. After 4 days of this therapy, however, hives, with severe itching, appeared on the extremities and spread to the rest of the body. There was no response

to ephedrine and Pyribenzamine, and 1 day later purpura of the thighs and lower abdomen developed. The purpura became progressively worse, and on October 26 he was sent to the hospital.

The past history revealed that the patient had had a chronic cough for 40 years precipitated by an explosion in a sulfur mine where he had been working. There was no history of any type of allergy or of epidermophytosis. A sister had had hay fever and a respiratory-tract infection in 1941, treated with sulfonamides, without reaction.

Physical examination showed a generalized exfoliative dermatitis, most marked on the hands and feet and in the groin, and a generalized urticarial eruption. There was also swelling of the face, eyelids, hands and feet, with a severe pitting edema of the lower legs. Over the lower half of the body there was a diffuse purpuric rash. Examination of the chest revealed diminished breath sounds and moist rales at the left base. The heart and abdomen were normal.

The temperature was 100.2°F., and the blood pressure was 128/70.

Examination of the blood disclosed a hemoglobin of 15.0 gm. and a white-cell count of 6250, with 72 per cent segmented neutrophils, 12 per cent nonsegmented forms, 14 per cent lymphocytes, 1 per cent monocytes and 1 per cent eosinophils; the platelet count was 280,000. The urine gave a ++ test for albumin, and the sediment contained many hyaline and granular casts, 10 erythrocytes and 2 leukocytes per high-power field. The sedimentation rate (Westergren method) was 46 mm. per hour. The bleeding time, clotting time and clot retraction were normal. The tourniquet test was positive. The blood urea nitrogen was 9 mg., and the fasting blood sugar 90 mg. per 100 cc. A blood culture was negative. Culture of interdigital scrapings from the fingers and toes was negative for fungi. The blood Wassermann reaction was negative. X-ray examination of the chest showed an area of consolidation in the apex of the left lower lobe in which there was a cavity 2.5 cm. in diameter. An electrocardiogram was normal.

On the 2nd hospital day the temperature rose to 102.2°F. The patient complained of upper abdominal pain and vomited small quantities of coffee-ground, guaiac-positive, material. On the following day the abdominal pain had become very severe, and there were abdominal distention, diffuse tenderness with marked rebound tenderness, some spasm and absent peristalsis, all of which, were considered to represent paralytic ileus. Therapy consisted of intravenous injections of fluids, blood transfusions and sedation. By the 4th hospital day all the signs of peritonitis with early shock were present, and the purpuric lesions had become confluent until there were large subcutaneous hemorrhages over the body. The white-cell count at that time was 19,900, with a shift to the left, and the hemoglobin had dropped to 10.1 gm. On the 5th hospital day the patient went into frank shock and pulmonary edema. He passed some bloody fecal material by rectum and had a sudden episode of hematemesis and died. An abdominal puncture done immediately after death obtained slightly bloody odorless fluid, containing 1550 white-cells per cubic millimeter (95 per cent neutrophils). Culture of this fluid was sterile.

At post-mortem examination there were numerous petechiae and discrete and confluent ecchymoses scattered over the trunk and extremities. These lesions were slightly elevated and showed an encrusted center. The skin of the soles of the feet, toes, groin and external ears was partially desquamated, but the buccal mucous membranes were normal.

In the thorax fibrous adhesions of the right upper lobe were present, but no pleural effusion was found. The heart weighed 385 gm. The pericardium contained a few subepicardial petechiae, and there were two petechiae on the mitral-valve leaflets. The lungs weighed 1820 gm. In the apical fourth of the left lower lobe there was an area of consolidation in the center of which was a cavity, 4 by 1.5 cm., containing turbid, gray, nonfoul fluid and communicating with several bronchi. The left upper lobe contained several firm, red, granular areas of consolidation, 1 or 2 cm. in diameter. The remainder of the left lung and the right upper and lower lobes were red and exuded a white, foamy fluid on section. The right middle lobe was dry and slightly emphysematous.

The peritoneal cavity contained 500 cc. of slightly turbid, thin, red fluid. The parietal peritoneum was smooth and glistening.

Several dark-greenish-brown foci of necrosis, measuring 7 by 10 to 7 by 40 mm., were present in the esophageal mucosa.

The stomach was dilated but otherwise normal.

The duodenum and the remainder of the small intestine were moderately distended and blue gray and had thickened, friable walls, with diffuse hemorrhagic necrosis of the mucosa and occasional skip areas showing congestion. The hemorrhagic mucosa of the jejunum and ileum demonstrated many superficial ulcerations, most marked in the jejunum on the tips of the folds. Over the most heavily involved portions of the small intestine the serosa showed focal ecchymoses covered by a thin fibrinous exudate. The remaining serosa was normal.

The large bowel was normal except for a hemorrhagic lesion of the cecum similar to the small-bowel lesions.

The liver, spleen, kidneys, adrenal and thyroid glands, bone marrow and lymph nodes were all normal.

It cannot be stated with certainty that the sensitivity reaction in this case was due to the penicillin received. However, the history strongly suggests that penicillin was the etiologic agent. In the first place, the symptoms increased in severity after the 2d penicillin injection, and then, after all signs of hypersensitivity had vanished, a 3d injection of penicillin promptly brought on a recurrence of the lesions, which progressed and resulted in death 11 days later. The fact that the penicillin was administered in a form that is slowly absorbed increased the patient's time of contact with the antigen, and may have prolonged and intensified the reaction. Although possible, it is unlikely that the sulfadiazine was the responsible antigen, since it was discontinued after the 2d day of treatment and was not readministered during the course of the patient's illness. Concerning the penicillin vehicle (oil and wax), studies by Gay and others have shown beeswax and peanut oil to be nonantigenic, and patients who are sensitive to penicillin in oil and wax have also had positive

sensitivity reactions to aqueous penicillin. Finally, it must be mentioned that the hypersensitivity may not be due to any of these factors and that the time relation to the drug therapy was purely fortuitous.

On the assumption that this was a sensitivity reaction to penicillin the question of its origin arises, since the patient had never received penicillin prior to his terminal illness. Because there appears to be some relation between the incidence and localization of penicillin reactions and fungous infection of the skin and because the patient showed more advanced skin lesions in the groin and between the toes, it was believed that he might have been sensitized by an earlier fungous infection. However, such an infection, by name and description, was firmly denied, leaving the possibility that he had had epidermophytosis that went unnoticed or, more likely, that he was one of the 5 percent or more of the population who show a primary sensitivity to penicillin. (New England J. Med., 25 May '50, R. M. Berne)

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Use of Milk to Control Vomiting Caused by Aureomycin: It has been proved by clinical experience that therapeutically effective amounts of aureomycin usually are absorbed from the gastrointestinal tract after the oral administration of from 500 to 750 mg. of aureomycin. The effectiveness and ease of this method of administration is often seriously impaired by the nausea and vomiting which may be produced by the aureomycin. Aluminum hydroxide gels when they are administered simultaneously with aureomycin usually control the nausea and vomiting satisfactorily. Several studies have shown, however, that when aluminum hydroxide gels are administered with aureomycin, the amount of aureomycin detectable in the serum is significantly less than when aureomycin is administered alone. (See Medical News Letters of 10 March and 14 July 1950.) Clinical results obtained in the treatment of infections suggest that, in spite of this interference with absorption, sufficient aureomycin to control many infections apparently is absorbed from the gastrointestinal tract after the administration of 750 mg. of aureomycin with 15 cc. of aluminum hydroxide gel. However, because the administration of aluminum hydroxide gels impairs the absorption of aureomycin, the administration of these gels with aureomycin seems to be contraindicated.

The use of aluminum hydroxide gels to control gastric irritation is usually not necessary if the aureomycin is administered with milk. Except in an occasional case, vomiting is controlled by the administration of milk and the patient is able to retain aureomycin with a minimal amount of distress. Fortunately, the administration of milk with the aureomycin does not impair the absorption of the aureomycin from the gastrointestinal tract. The levels of aureomycin in the serum after the administration of 750 mg. of aureomycin with 200 cc. of milk are approximately the same as the levels obtained when 750 mg. of aureomycin is given alone to fasting patients. The therapeutic

results, when aureomycin and milk have been administered simultaneously, have been satisfactory. The administration of milk with aureomycin, therefore, appears to be an acceptable method of reducing gastrointestinal irritation and vomiting without interfering with the absorption of aureomycin into the serum. (Proc. Staff Meet., Mayo Clin., 21 June '50, L. G. Bartholomew and D. R. Nichols.)

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Protection of Mice Against X-Radiation by Thiourea: It was reported previously that thiourea protected desoxyribosenucleic acid (DNA) against x-ray depolymerization in aqueous solution and in vivo. Barron et al. have reported that sulfhydryl-containing enzymes in aqueous solution were inactivated by x-radiation because of the oxidation of the sulfhydryl group and that the enzymes were reactivated by the addition of glutathione. Ephrati found that the inactivation of tetanus toxin and of staphylococcus hemolysin by x-radiation in aqueous solution was inhibited by the presence of reducing agents, such as ascorbic acid and glutathione, whereas oxidizing agents did not inhibit the action. Forssberg, however, found that reducing agents (cysteine) enhanced the inactivation of catalase by x-radiation, whereas oxidizing agents (cystine) inhibited this action. Patt and his co-workers have recently found that cysteine decreased the mortality of x-rayed rats, whereas cystine was ineffective. The protection by thiourea of a vital cellular constituent, such as DNA might therefore be assumed to affect the mortality of x-rayed animals.

Male, white mice (Detwiler) weighing 18-22 Gm. were allowed prescribed food and water ad libitum. The mice were irradiated in groups of 20-25 with 650 r given at the rate of 100 r/min. The constants of the x-ray machine were 250 kv. and 15 ma. A copper filter 1/2 mm. thick was used, in addition to the inherent filtration of 3 mm. of aluminum.

In a preliminary experiment an aqueous solution of thiourea (90 mg./ml) was injected intraperitoneally in a single dose (1,280 mg./Kg.) 5 min. before irradiation. In a subsequent experiment, thiourea was administered in the drinking water in a concentration of 1 percent for a period of 6 days before irradiation. In a third experiment, intraperitoneal injection (2,140 mg./Kg.) of an aqueous thiourea solution (90 mg./ml) were given 5 min. before irradiation to one group and injections of the same dose 5 min. after irradiation to another. Because thiourea had been found to be destroyed rapidly, the irradiation was carried out as soon as possible after injection.

When the thiourea dose was 1,280 mg./Kg., 37 percent of the mice injected before irradiation survived at the end of 3 weeks as compared to 22 percent of the irradiated controls. When 1 percent thiourea was added to the drinking water for 6 days before irradiation, 86 percent survived at the end

of 4 weeks, but only 68 percent of the irradiated controls survived. Although addition of thiourea to the drinking water caused a loss in body weight, the mice so treated gained weight after irradiation more rapidly than did the irradiated controls. The injection of 0.1 percent thiourea (2,140 mg./Kg.) 5 min. after irradiation was only slightly effective, whereas injection of the same dose 5 min. before irradiation was most effective in increasing the number of survivals after irradiation. Of the group injected with thiourea (2,140 mg./Kg.) before irradiation, 35.2 percent survived, whereas only 7 percent of the group injected after irradiation and only 2 percent of the irradiated controls survived.

As a result of these experiments, it is believed that thiourea and possibly other reducing agents lower the mortality caused by x-radiation because of the protection afforded to certain vital cellular constituents such as nucleic acid. It is possible that other easily oxidized constituents, such as sulfhydryl-containing enzymes, ascorbic acid, and glutathione, are protected in the same manner. The possibility that thiourea and related substances diminish the therapeutic effects of x-radiation besides lowering the mortality remains to be investigated. (Science, 21 July '50, G. Limperos and W. A. Mosher)

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Vitamin P Protection Against Radiation: Griffith et al. were the first to demonstrate the protective action of flavonoids in radiation injury. Clark and associates found that a "flavonoid preparation derived from lemons, administered in the drinking water to guinea pigs, reduces the mortality from total-body roentgen irradiation by about half". Field and Rekers conducted an extensive investigation on the protective action of vitamin P factors, using dogs. Mortality after radiation was reduced to 10 - 17 percent (with a significant reduction in the hemorrhagic diathesis), as against 60 percent mortality in the control animals. The investigators concluded "that previous misunderstanding of the nature of vitamin P has arisen from both the failure to recognize that several flavonone analogues possess very similar antihemorrhagic activity and that ascorbic acid has the capacity to potentiate activity in other flavonones".

In this investigation, 50 rats of British brown breed were submitted to x-ray irradiation. One group of 20 rats served as control, and a second group of rats was given vitamin P compound (CVP compound) isolated from citrus waste. The average weight of the rats was 180 Gm. The radiation factors were 250 kv., 15 ma., with 0.5-mm. copper and 3.0-mm. bakelite filters. Target distance was 27.5 cm., and 210 r/min. was the dose rate. All rats received 800 r total-body radiation in a single exposure.

Sixteen rats of the control group (80 percent) succumbed during the second and third weeks after the exposure. All of them manifested gross hemorrhages of various gravity and pronounced pathological lesions in the adrenal glands.

The zona fasciculata and zona reticularis were particularly affected, with argentaffin fibrils showing signs of degeneration. Four rats (20 percent) survived in spite of numerous petechial hemorrhages and generalized purpura.

The treated animals were divided into two groups. Ten rats received orally 4 mg. of vitamin P compound per day for 10 days, 3 days prior to radiation and 7 days after radiation. Twenty rats received 5 mg. of vitamin P per day for 30 days, 7 days prior to radiation and 23 days after radiation. In the group of 10 animals which received a total amount of 40 mg. of vitamin P compound, the mortality from irradiation was reduced to 40 percent. Moreover, those rats which did not succumb to the injurious effect of radiation lived longer. The petechial hemorrhages in the treated animals were considerably less pronounced, but some pathological changes in the adrenal cortex were observed, mostly in the zona reticularis (vacuolization). In the group of 20 rats given a total of 150 mg. of vitamin P compound in a period of 30 days, mortality from irradiation was reduced to 10 percent. In this group, petechial hemorrhages were very slight and in some rats apparently absent.

From these observations it appears that the vitamin P compound, which contains four flavonoids naturally present in citrus fruit, gives considerable protection to rats against a total-body, near-lethal dose of radiation. In radiation injury, there seems to be present a pronounced increase in capillary fragility which might be prevented by large doses of flavonoids naturally present in citrus fruit. (Science, 28 July '50, B. Sokoloff et al.)

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Measurements of the Radon Gas Exhalation from Luminous Paint on Aircraft Instument Dials and Their Consequences for a Possible Health Hazard: The health hazard from luminous paint in instrument dials of aircraft is twofold: the radium in the paint emits a penetrating gamma radiation and exhales radon gas which contaminates the surrounding air. In completion of a previous related report on measurements of the gamma radiation (see Medical News Letter, 7 April 1950, p. 14), the present report gives data concerning the emanating power of luminous paint.

The health hazard from radon-contaminated air arises exclusively from inhalation, which brings radon, a pure alpha emitter, and its alpha-radiating decay products into the blood circulation and distributes it all over the organism. Because of their high specific and total ionization, the alpha rays in this kind of radiation hazard are the exclusive carrier of the biological effect. The total alpha activity of freshly generated radon gas follows a complicated law due to the rapid change of the short lived alpha active decay products, radium A, and radium C' A measuring process which will give accurate data for such

radiation damage must record only the alpha activity of radon and its decay products. A method which meets this requirement using the technic of alpha tract counting in a nuclear photographic emulsion was devised.

The following value for the emanating power of luminous paint was derived from the measurements: a paint layer of 1 square centimeter area exhales under normal atmospheric conditions 1.24×10^{-12} Curie per second. Calculation on the basis of this value shows that the radon concentration which might arise in cockpits of normal aircraft from the instrument panel stays well below the tolerance level. However, in cases of closed cabins with a recirculating re-conditioned air mass the radon exhalation from a normal aircraft instrument panel brings the concentration far above the tolerance level. In such cases, the safety engineer must provide for a strict separation of the air inside the instruments from the cabin air by hermetically sealed cases or other means. The use of a non-emanating and non-gamma-radiating new type luminous paint containing polonium is an alternative, not necessarily final, solution for the design of experimental types of submarines or aircraft in which the use of the present type Navy luminous paint is excluded for radiation safety reasons. (Proj. NM 001 059.18.02 (formerly NM 001 059.25), Rep. No. 2, 26 May '50, H. G. Schaefer, School of Aviation Med., NAS, Pensacola, Fla.)

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Acute Toxicity of Zirconium, Columbium, Strontium, Lanthanum, Cesium, Tantalum and Yttrium: Several metals which received little attention in the past have recently attracted attention because they have become useful in various industrial processes. It is therefore important to obtain information on the toxicity of these metals in order to ascertain whether health hazards are associated with their industrial uses. Zirconium, columbium, yttrium, lanthanum, strontium, and cesium also occur as fission products, and an accurate evaluation of the toxicologic effects due to radiation necessitates data on the toxicity of the stable forms of these metals. Therefore, an investigation was conducted of the acute toxicity of zirconium, columbium, strontium, lanthanum, cesium, yttrium, and tantalum, and the results of these studies are presented.

It was found in experiments on adult rats that the acute oral LD_{50} values for 5 zirconium salts ranged from 990 to 2,290 mg. of zirconium per Kg. It is therefore concluded that large oral doses of zirconium compounds can be ingested without harmful effects. The intraperitoneal LD_{50} values ranged from 63 to 939 mg. of zirconium per Kg., with zirconium sulfate being the most toxic and sodium zirconyl sulfate the least toxic.

Lanthanum compounds exhibited a low toxicity when administered orally. Of 6 compounds tested, lanthanum ammonium nitrate was the most toxic, the LD_{50} being 830 mg. of lanthanum per Kg. No deaths among the rats occurred

from doses as high as 10 Gm. per Kg. of lanthanum oxide and 5 Gm. per Kg. of lanthanum sulfate. When 5 of these compounds were administered by the intraperitoneal route, the LD_{50} values ranged from 134 to 209 mg. of lanthanum per Kg.

Tantalum oxide was nontoxic when administered orally, while potassium tantalum fluoride, tantalum chloride and potassium columbate exhibited a low toxicity by this route. When tantalum chloride was given intraperitoneally, the LD_{50} was 38 mg. of tantalum per Kg. Both potassium columbate and columbium chloride were quite toxic to rats when given intraperitoneally, the LD_{50} values being, respectively, 86 and 14 mg. of columbium per Kg.

The intraperitoneal toxicity of 5 strontium compounds ranged from an LD_{50} of 88 to an LD_{50} of 247 mg. of strontium per Kg. Cesium exhibited very low intraperitoneal toxicity to rats except in the case of cesium hydroxide, in which the LD_{50} was 89 mg. of cesium per Kg. Yttrium appeared to be relatively nontoxic; the LD_{50} values for three yttrium compounds ranged from 117 to 395 mg. of yttrium per Kg.

Lanthanum chloride (molar concentration, 1×10^{-5}) was found to be able to replace aluminum as an activator for the succinic dehydrogenase system. Strontium chloride (molar concentration, 4×10^{-4}) was partially effective in replacing calcium in this system. Columbium (5×10^{-4} molar potassium columbate) caused approximately a 50 percent inhibition and 1×10^{-3} molar yttrium chloride produced a 25-percent inhibition of the succinic dehydrogenase activity of mouse liver in vitro. Cesium chloride failed to inhibit the adenosine triphosphatase activity of mouse liver in vitro, while salts of other metals caused 50-percent inhibition at the following molar concentrations: columbium chloride, 4.2×10^{-4}; potassium columbate, 5.8×10^{-4}; lanthanum chloride, 4.4×10^{-3}; strontium chloride, 8.3×10^{-2}; yttrium chloride, 4.5×10^{-3}; zirconyl chloride, 1.05×10^{-3}. (Arch. Indust. Hyg. and Occup. Med., June '50, K. W. Cochran et al.)

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Field Tests of Molluscacides Against Australorbis glabratus in Endemic Areas of Schistosomiasis in Puerto Rico: Efforts have recently been made by several investigators to develop molluscacides for the destruction of the snail intermediate hosts of the human schistosomes. Despite the fact that copper sulfate has been reported to be an effective molluscacide, the use of the compound over a period of many years has not resulted in adequate control of schistosomiasis. The most extensive field tests have been conducted by McMullen et al. in Japan and have resulted in the finding that sodium pentachlorophenate and dinitro-o-cyclohexylphenol or its dicyclohexylamine salt were the most effective of all chemicals tested for the control of Oncomelania nosophora, the intermediate host of Schistosoma japonicum.

Certain promising compounds were tried in field tests in the vicinity of Brownsville, Tex., in January 1949 by Nolan and Berry on Tropicorbis obstructus donbilli, which is closely related to Australorbis glabratus, Australorbis glabratus Say is widely distributed throughout Puerto Rico, and is the only species there known to serve as the intermediate host of Schistosoma mansoni. Additional studies were made in Puerto Rico in an endemic area of schistosomiasis and under a variety of aquatic conditions.

Eleven chemical compounds which proved effective in killing A. glabratus in the laboratory in dilutions of 10 ppm or less were tested on this same species of snail in its natural environment in Puerto Rico. Six of these proved to be very effective molluscacides, although the present price of four of them (2,4,6-triiodophenol, 2,4,6-triiodophenol sodium salt, 2,4,6- tribromophenol, and pentabromophenol) may prohibit their use on a large scale. Two compounds (sodium pentachlorophenate and copper pentachlorophenate) are excellent molluscacides and their cost is reasonable. In a stream near Los Pena, sodium pentachlorophenate at 9.5 pmm calculated on a 6-hour flow-rate dose destroyed all snails for a distance of 1-1/2 miles downstream in spite of the entrance of three untreated tributary streams within this area. Embryos within the snail eggs were also killed. The compound was lethal to catfish, guppies, and eels, but apparently did not affect crayfish.

The toxicity of the effective compounds for mammals is under further study, and field trials are being extended to other areas. (Pub. Health Rep., 28 July '50, E. G. Berry et al.)

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Methylandrostenediol - A Non-Virilizing Derivative of Testosterone in Metastatic Cancer of the Breast: Methylandrostenediol was chosen for clinical trial in patients with metastatic cancer of the breast because it was the first of a series of compounds tested which, on bioassay, showed renotropic effects on experimental hydronephrosis in female adult mice resembling those of testosterone propionate. A marked degree of protection afforded the tubular epithelial cells by testosterone propionate and methylandrostenediol has been observed in experimental hydrohephrosis. This renotropic property of methylandrostenediol is at present under investigation in human renal disorders. Testosterone, vinyl testosterone, cis testosterone, testosterone tocaptate, and testosterone carbonate failed to give such renal protection.

Methylandrostenediol was given to 7 women with metastasizing cancer of the breast for periods of from 1 to 7 months, and in doses varying from 25 mg. in oil given intramuscularly to 100 mg. per day intramuscularly in aqueous suspension. The latter dose was found to be clinically the most effective. Pellets of 60 mg. implanted every 20 to 30 days were also used. The maximal total dose was 10 Gm. given intramuscularly in aqueous suspension.

The patients were women ranging in age from 34 to 64 years, in whom cancer of the breast had been diagnosed as being of from 1 to 8 years' duration prior to the initiation of methylandrostenediol therapy. Subjective improvement with varying degrees of euphoria and a sense of well-being occurred in all cases and lasted for from 1 to 7 months under therapy. Objective clear-cut calcification of bone lesions studied by x-ray was found in 2 patients. Soft tissue lesions regressed in 2 other instances under methylandrostenediol therapy. Studies of blood chemistry (phosphorus, calcium, alkaline phosphatase, NPN and total protein) showed trends comparable to those seen in the course of chemotherapy of breast cancer with testosterone. There were instances of a drop in blood phosphorus, as well as fluctuations of blood calcium (without, so far, any cases of pathological hypercalcemia). Elevations of blood alkaline phosphatase were observed repeatedly following the administration of methylandrostenediol.

A metabolic study in one woman of 42 without cancer showed that methylandrostenediol has a protein anabolic effect of about 50 percent of that obtained with a similar dose (25 mg. per day for 6 days) of testosterone propionate. These measurements were made by means of nitrogen, phosphorus, calcium, and potassium balance studies on a metabolic ward. Six-day metabolic periods were alternated with control periods of 12 days. A constant diet was maintained throughout the experiment.

None of the women treated showed any virilizing or toxic signs. One patient who had grown a beard and acquired acne and a deep voice during testosterone therapy lost these symptoms under methylandrostenediol therapy, while she showed subjective as well as objective improvement of her breast cancer.

Preliminary clinical observations seem to indicate that methylandrostenediol is a non-virilizing steroid hormone with moderate protein anabolic effect, and that it causes subjective well-being in patients with cancer of the breast. It did not bring about in the authors' experience any of the undesirable biochemical phenomena, such as water retention or hypercalcemia which often occur with testosterone. These brief clinical experiences do not justify conclusions as to the exact therapeutic value of this drug. However, they indicate the need for further critical evaluation on a larger scale. (Proc. Soc. Exper. Biol. and Med., May '50, F. Homburger et al.)

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Licensure of BCG Vaccine: On 12 July, the U. S. Public Health Service licensed the Research Foundation and the University of Illinois for "manufacture, exportation, importation and sale" of BCG. Until now, licensure of the product has awaited manufacture in accordance with certain requirements. In view of the divergence of opinion about this biological product, it seems in order to consider the significance of such action. It means that the vaccine produced by the

licensed laboratory has been found safe by trial with animals, that it is free from contaminating substances, and that it will produce a satisfactory immediate reaction in animals and human beings when used within the prescribed time limit. Thus, the vaccine may enter interstate commerce and will be available to health officers and clinicians who wish to use it as a protective measure against tuberculosis.

In those places of the world where tuberculosis is a national emergency and where prosecution of the usual control methods is impossible, it is understandable that BCG has been given extensive application. In this country, where we are not faced with the same deficiencies, the medical profession for the most part has not advocated the widespread usage of the vaccine. The Council on the Management and Treatment of Diseases of the Chest, reporting for the American College of Chest Physicians, has recommended that the use of BCG vaccine be restricted to controlled studies. The American Trudeau Society recommends that the use of BCG be limited to groups especially exposed to the risk of tuberculous infection.

The Public Health Service, like others concerned about tuberculosis, would welcome any agent which would prevent the personal tragedy and public health problem of tuberculosis. It has not yet been conclusively demonstrated that BCG is such an agent. However, efforts to find more stable and suitable immunizing agents are going forward. The gains which are being made with proved control methods ought not to be imperiled.

If the use of BCG in the United States is to contribute more information than has been gained in almost 30 years of use elsewhere, vaccination programs must be carefully planned. It would be desirable if State and local health departments which are immediately responsible for tuberculosis control were to develop plans for the use of the vaccine in their jurisdictions and keep records of those who are vaccinated. A beginning has been made in Wisconsin where the State Health Department has reviewed all requests for the vaccine desired from research laboratories, and in New York where the State Department of Health has manufactured BCG vaccine and has kept records of persons in the State who were vaccinated.

Mass BCG vaccination campaigns are not indicated in this country, where tuberculosis morbidity and mortality rates are relatively low. It is recommended that vaccination be limited to those persons who are particularly vulnerable to exposure. These include: (1) those physicians, nurses, laboratory workers, hospital employees, and others who are exposed by occupation; (2) those individuals or groups exposed to continued contact with tuberculosis; and (3) patients, inmates and employees of institutions, such as mental hospitals and prisons, in which case-finding programs indicate that exposure to tuberculosis is likely to be high. (Editorial, Pub. Health Rep., 4 August '50, R. J. Anderson)

Technics and Circumstances in the Bacteriologic Diagnosis of Tuberculosis: Studies were conducted by the author to evaluate the bacteriologic methods used in the laboratory diagnosis of tuberculosis. For 1 year, divided specimens of sputa were tested in his laboratory in Albany, N. Y., and in the laboratory of the Tuberculosis Division of the U. S. Public Health Communicable Disease Center in Atlanta, Ga. During the course of this work, certain factors were observed to influence the success or failure of diagnostic methods.

Efficiency of Standard Tests in Relation to the Source of the Specimens. From 60 to 85 percent of the total specimens sent to the author from sanatoria contain tubercle bacilli. The majority are positive by smear alone and most of those examined by culture develop more than 100 colonies on each tube of medium. In strong contrast to these, are the characteristic specimens examined in a public health laboratory. The author finds tubercle bacilli in from 15 to 25 percent of the specimens received from the general public. Smears fail to demonstrate the micro-organisms in the majority of cases, and the ones which are positive by culture usually develop fewer than 25 colonies on each tube of medium.

Standard tests were applied to each of these 2 types of specimens and their efficiency assessed. The criterion for judging the efficiency of a test was the number of specimens in which the test demonstrated tubercle bacilli as compared to the total number of specimens in which the bacilli were actually present. In field material, the absolute number of positive specimens are never known exactly. Therefore, the number of specimens in which bacilli were found by one or more multiple test methods was determined instead. All the specimens were studied by at least 5 tests, i.e., direct and concentrate smears, and direct, supernatant, and concentrate cultures after NaOH or Na_3PO_4 digestion. Sixty percent of the specimens were also tested in one or two guinea pigs. These studies were performed by a single group of technicians using standardized technics, common supplies, and the same culture room and incubator.

The best combinations of the standard concentrate smear, culture, and the guinea pig tests or both failed to demonstrate tubercle bacilli in from 10 to 20 percent of the field specimens in which micro-organisms actually were found by some one of the above 5 tests. Smears alone were less than 50 percent efficient in field material; cultures alone, about 75 percent; and guinea pigs, 80 percent. All 3 standard tests alone or in combination had a significantly higher efficiency when used on sanatoria material. Seventy percent of the positive sanatoria specimens were positive in all of the 5 tests used. Only 35 percent of the positive field specimens achieved this score.

Tubercle bacilli were demonstrated by a single standardized culture technic in 80 percent of 210 samples of pooled positive sanatoria sputa held under controlled conditions of temperature for from 1 to 15 days. Under the

same conditions, and using the same cultural technic, the author was able to recover the micro-organisms in 46 percent of 210 samples of pooled field sputum, each of which was originally inoculated with many living tubercle bacilli. It was observed that not only did field specimens contain fewer bacilli than did sanatoria specimens, but that standard tests were less effective in demonstrating these micro-organisms. Perhaps present test methods simply fail to demonstrate the presence of small numbers of micro-organisms, or perhaps the bacilli in these specimens are more adversely affected by their environment or by laboratory treatment.

Contamination. Contamination is a much greater hazard in the examination of field specimens than of those from sanatoria, because specimens from sanatoria are collected from a public educated to handle sputa with caution. Field specimens, on the other hand, are subject to gross contamination during collection and to many alterations during transportation. In the author's experience, twice as many cultures of field specimens are completely lost because of contamination as are cultures of sanatoria specimens. The effect of this greater degree of contamination imposed on the fewer micro-organisms present in field specimens is of considerable practical importance.

It is not known absolutely how many positive specimens are lost because of overgrowth of culture tubes by contaminants, but it is possible to estimate that the loss of positive specimens resulting from contamination can be 4 times greater in field specimens than in sanatoria specimens. It is also possible to calculate that approximately one third of the possible positive cases in field material may be lost because of contamination and defectiveness of standard diagnostic methods. Specimens from the field certainly deserve more thorough cultural study than those from sanatoria patients and greater efforts should be made to suppress contaminating organisms.

Time and Temperature. During the course of these studies, it became quite evident that the shipment of specimens between Albany and Atlanta introduced a number of factors which affected the results obtained in each laboratory. Since then, the influence of temperature and time under controlled conditions have been regularly measured. It has been found that field sputa specimens subjected to temperatures above 5° C. for more than a few days rapidly deteriorate. At 5° C. no appreciable loss of viable micro-organisms was detected by culture in 210 samples of field sputa inoculated with many living tubercle bacilli and examined at intervals of 1, 2, 3, 5, 7, 10, and 15 days. Similar specimens maintained at 30° C. showed only 81 of 210 remaining positive for from 1 to 15 days. At 37° C. only 4 of 210 samples remained positive during the same period. In another group of 210 exposed to 37° C. for 15 hours and held thereafter at 20° C., only 10 remained positive during the same test period. Sanatoria specimens show less deterioration at 30° C., although they also deteriorate quickly at 37° C.

The causes responsible for these changes have not been determined, but it is evident that specimens collected from the general public and mailed to the laboratory may frequently be exposed to circumstances which destroy their suitability for accurate bacteriologic examination.

Discussion and Conclusions. It would seem that the elaboration of technical procedures may be of less importance in the bacteriologic examination of specimens than the simple practical problems of prompt collection, care in minimizing contamination, suitable storage, and prompt delivery of the specimen. These practical considerations seem so weighty that every effort should be made to have the examinations performed locally. Moreover, these factors should also be given careful consideration in the evaluation of new diagnostic methods. Results obtained by different laboratories may differ widely, depending on the sources of specimens and their condition at the time they are examined. The differences may not be due to the superior virtues of particular test methods.

The author's experience also suggests that there are factors in the relationship between the tubercle bacillus and its environment that are not clearly understood which may appreciably modify the success of diagnostic tests. Differences in the vitality of tubercle bacilli in specimens from different sources may be of considerable significance.

Every effort should be made to examine specimens in laboratories close to their source. Specimens should be collected carefully to minimize contamination, should be kept as cool as possible, and examined as soon as possible by multiple test methods. (Am. J. Pub. Health, July '50, J. N. Abbott)

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Current Morbidity - January-May 1950: The incidence rate for all causes in the Navy and Marine Corps has recently been reflecting the improved health of personnel in the service. Based on the first 5 months, the annual morbidity rate for 1950 is almost 17 percent lower than for the corresponding period in 1949.

Among the conditions contributing to the morbidity picture, other than the acute respiratory infections usually most prevalent at this season, significant improvement can be noted in the incidence rate for venereal diseases, which is running 26 percent below the corresponding period in 1949. A reduction of about 7 percent is also observed for injuries during the first 5 months of 1950. The rate of 361.3 per 1,000 strength for all ships and stations in April 1950 is the lowest, with the exceptions of November and December 1949, since the inception of current morbidity reporting.

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Penicillin Dosages Before Dental Extractions, Tonsillectomy, and Adenoidectomy in Patients with Rheumatism and Congenital Heart Disease: Following dental extractions and removal of tonsils and adenoids, bacteria are frequently present in the blood stream for short periods of time. In rheumatic individuals or in patients with congenital heart disease these bacteria, usually alpha streptococci (Streptococcus viridans), may lodge in the heart valves and cause bacterial endocarditis. Alpha streptococci are usually resistant to sulfonamide drugs. Penicillin is, therefore, recommended for prophylaxis.

Except in emergencies operative procedures in rheumatic individuals should be deferred until there is no clinical evidence of rheumatic activity and laboratory tests indicate that the rheumatic process is subsiding. Patients should be free from upper respiratory infection.

The minimum recommended dosage of penicillin is 300,000 units of aqueous penicillin intramuscularly 30-60 minutes before extraction or operation, together with 300,000 units of procaine penicillin in oil injected intramuscularly at the same time in a different site.

Penicillin prophylaxis is not necessary for the extraction of deciduous incisors or bicuspids unless infection of the gum is present. It should be used for the extractions of deciduous molars, all permanent teeth,and for tonsillectomy and adenoidectomy. In most instances it is best to extract one tooth at a time; multiple extractions should be avoided. In cases of extensive gum infection or severe root infections (apical abscesses) it is advisable to give several doses of penicillin starting the day before operation and continuing one or two days thereafter.

Women with rheumatic or congenital heart disease should receive penicillin prophylaxis at the time of delivery. It is also recommended for patients requiring gastrointestinal surgery. (Am. Council on Rheumatic Fever of the Am. Heart Assn.)

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Course in Aviation Medicine Cancelled: It is announced that owing to the increased work load, the courses in Aviation Medicine (see Medical News Letter, 4 August 1950, p. 25) scheduled for Volunteer Reserve medical officers on 2-14 October 1950 and 2-14 April 1951 at the Naval School of Aviation Medicine, Pensacola, Florida, are cancelled. (Reserve Div., BuMed)

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American Heart Association Applications Accepted: Dr. Howard B. Sprague, President of the American Heart Association, has announced that new applications

for Research Fellowships and Established Investigators will be accepted up to 15 September 1950. Applications for Research Grants-in-Aid, including grants to basic sciences, may be filed up to 15 December 1950. Information and application forms may be obtained from Dr. Charles A. R. Connor, Medical Director, American Heart Association, 1775 Broadway, New York 19, N. Y.

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Membership in the American College of Physicians: The American College of Physicians has announced that proposals for membership in the College must be received by 15 September 1950 if they are to be acted upon by the Committee on Credentials at its next meeting in November.

Current proposal forms in the case of Naval medical officers should be forwarded to BuMed promptly, in time for review and processing prior to 15 September deadline. (Professional Div., BuMed)

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Model Clinical Pathology Laboratory Established: It was recently announced that a model clinical pathology laboratory is being established in Atlanta, Georgia, jointly by the Communicable Disease Center, U. S. Public Health Service; the Grady Memorial Hospital; and the Emory University School of Medicine. The objectives of the Center are: (1) to develop, through research, more reliable methods for clinical laboratories; (2) to educate and train laboratory personnel. Certain services of the laboratory will be made available to the whole of the United States.

The laboratory is being headed by Dr. F. William Sunderman, nationally known investigator in experimental medicine and president-elect of the American Society of Clinical Pathologists. It is hoped that the new clinical laboratory will provide the basis for a nation-wide effort to improve the quality of laboratory tests performed in the clinical laboratories of the United States.

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BUMED CIRCULAR LETTER 50-79 28 July 1950

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Fleet Marine Force Activities

Subj: Nomenclature and Definitions Pertaining to Medical Treatment Facilities Not Classified as Fixed

Encl: (1) SecDefense Memorandum of 27 April 1950 to the Secretaries of Army, Navy, and Air Force

1. Enclosure (1) includes definitions relating to capacity and the availability of beds (bed status) to be used by land-based non-fixed medical treatment facilities and medical treatment facilities afloat. These definitions are to be used by all such activities in referring to and the reporting of beds and capacities.

2. It is requested that all ships and the medical treatment facilities of the Fleet Marine Force which report on Monthly Morbidity Report (NavMed-582) add the following information by typewriter in the top margin of said report beginning with the one submitted for the month of August, 1950.

1. Designated bed capacity _____
2. Operating Beds _____
3. Occupied beds _____

3. Ships not having a medical officer attached shall report the number of Operating Beds as zero (0), since it is not considered that the sick bay would be fully staffed in the absence of an attached medical officer (see definition of Operating Beds, enclosure (1)). C. A. Swanson

NOTE: The letter above together with the enclosure appears in the 31 July 1950 Navy Department Bulletin.

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BUMED CIRCULAR LETTER 50-80 28 July 1950

From: Chief, Bureau of Medicine and Surgery
To: All Hospitals and Dispensaries

Subj: Computing of Capacities and Bed Status

Ref: (a) BuMed C/L 50-28 of 22 March 1950
(b) SecNav ltr 49-883 of 13 December 1949
(c) BuMed C/L 50-35 of 14 April 1950

This letter states that in computing capacities and bed status of medical activities it is essential that uniform interpretations and practices be followed as outlined in reference (a). The figures reported by the activities concerned indicate that there are errors in the computations as well as misinterpretations of the definitions. Therefore, information and comments are included that will assist in computing accurate and practical capacity and bed status figures that may be utilized in planning. All activities should carefully follow the procedures and definitions outlined in reference (a) in complying with paragraph 7 of reference (c) and add any remarks that will help to clarify any unusual reported figures.

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BUMED CIRCULAR LETTER 50-81 31 July 1950

From: Chief, Bureau of Medicine and Surgery
To: All Holders of the Bulletin of the Bureau of Medicine and Surgery Circular Letters

Subj: Social Histories Obtained by the American National Red Cross

1. All Medical Department personnel shall take necessary action to insure that social history reports obtained through or by the American National Red Cross are held strictly confidential and that their contents will not under any circumstances be communicated to the patient, his relatives, friends, nor other unauthorized persons.

2. Such reports shall not be included in clinical records of patients nor in the record of proceedings of Physical Evaluation Boards. C. A. Swanson

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BUMED CIRCULAR LETTER 50-82
SPECIAL REGULATIONS 42-85-5
AIR FORCE REGULATION 160-61

DEPARTMENTS OF THE ARMY, NAVY AND THE AIR FORCE
WASHINGTON 25, D. C.

JOINT LETTER

3 August 1950

LIAISON WITH PUBLIC HEALTH SERVICE

1. General. - The Administrator, Federal Security Agency, has offered the services of the Public Health Service for the purpose of safeguarding the health of military personnel through its cooperative relationships with State and local health authorities. This agency will cooperate with the Armed Forces in establishing suitable measures in regard to health and sanitation in extra-military areas and may, if desired by the Armed Forces, act as the liaison between the Armed Forces and the State or local health agencies. This type of service will be similar to that which the Public Health Service gave to the Armed forces during World War II.

2. Medical Directors. - The medical directors in each of the public health regional areas, together with the States they serve, are listed below. Commanders of continental armies, naval districts and Air Forces should, either directly or through their surgeons, or staff medical officers, contact those Public Health Service medical directors who cover the States in which their area is located. The Public Health Service has indicated its assurance that these district officers will do their utmost to facilitate the solution of community health problems of interest to the Department of Defense.

FEDERAL SECURITY AGENCY
Public Health Service
Washington 25, D. C.

Regional Medical Directors	Region	States Covered	Regional Headquarters
Medical Director	I	Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island	Federal Security Regional Office #1 120 Boylston Street Boston 16, Mass.
Medical Director	II	New York, Pennsylvania, New Jersey, Delaware	Room 1200 42 Broadway New York 4, N. Y.
Medical Director	III	Maryland, District of Columbia, West Virginia, Virginia, North Carolina	Room 2640 Temporary Building 4 4th and Jefferson Drive, SW Washington 25, D. C.
Medical Director	IV	Michigan, Ohio, Kentucky	1100 Chester Avenue Cleveland, Ohio
Medical Director	V	Minnesota, Wisconsin, Illinois, Indiana	Room 200 69 West Washington St. Chicago 2, Illinois
Medical Director	VI	Tennessee, Mississippi, Alabama, Florida, South Carolina, Georgia, Puerto Rico, and Virgin Islands	Room 629 #10 Forsyth St. Bldg. Atlanta 3, Georgia
Medical Director	VII	North Dakota, South Dakota, Nebraska, Kansas, Iowa, Missouri	2305 Fidelity Bldg. 911 Walnut Street Kansas City 6, Kansas

Regional Medical Directors	Region	States Covered	Regional Headquarters
Medical Director	VIII	Louisiana, Arkansas, Texas, New Mexico, Oklahoma	201 Norman Building Dallas 2, Texas
Medical Director	IX	Montana, Idaho, Wyoming, Utah, Colorado	9 Equitable Building 730-17th Street Denver 2, Colorado
Medical Director	X	Washington, Oregon California, Nevada, Arizona, Alaska, Hawaii	441 Federal Office Bldg. Civic Center San Francisco 2, Calif.

BY ORDER OF THE SECRETARIES OF THE ARMY, THE NAVY, AND THE AIR FORCE:

OFFICIAL:
EDWARD F. WITSELL
Major General, USA
The Adjutant General

J. LAWTON COLLINS
Chief of Staff, United States Army

OFFICIAL:
CHARLES WELLBORN, JR.
Rear Admiral, U. S. Navy
Deputy Chief of Naval Operations
(Administration)

C. A. SWANSON
Chief of Bureau of Medicine and Surgery
Department of the Navy

OFFICIAL:
L. L. JUDGE
Colonel, USAF
Air Adjutant General

HOYT S. VANDENBERG
Chief of Staff, United States Air Force

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BUMED CIRCULAR LETTER 50-83 1 August 1950

From: Chief, Bureau of Medicine and Surgery
To: Senior Member Physical Evaluation Board
First NavDist, USNH Chelsea
Third NavDist, USNH St. Albans
Fourth NavDist, USNH Philadelphia
Fifth NavDist, USNH Portsmouth, Va.
Sixth NavDist, USNH Charleston, S. C.
Ninth NavDist, USNH Great Lakes, Ill.
Eleventh NavDist, USNH San Diego

Twelfth NavDist, San Francisco
PRNC, USNH Bethesda
USNH, Camp Lejeune, N. C.
USNH, Camp Pendleton, Oceanside, Cal.

Subj: Physical Evaluation Board; Monthly Report of Cases

Ref: (a) NavMed-268 teletype message of 17 March 1950

This letter (1) cancels the provisions of reference (a), (2) directs that beginning with the data for the month of July 1950 a speedletter report be submitted as of the last working day of each month and containing certain information, (3) directs that a special report be prepared to show cumulative figures from the time the board was organized through 30 July 1950, and (4) directs that the original of the report be sent to BuMed (Code 24) and the first carbon to the Physical Review Council, Washington, D. C., not later than the 5th of each month for the preceding month.

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BUMED CIRCULAR LETTER 50-84 2 August 1950

From: Chief, Bureau of Medicine and Surgery
To: All Stations

Subj: Deceased Army and Air Force Personnel; Reimbursement for Costs in Connection with the Preparation of Remains

1. Reimbursements for the cost to the medical department of supplies and services required in connection with the preparation of remains of deceased Army and Air Force personnel will be made at Bureau level by the respective Departments. It is therefore required that all medical department activities furnishing such supplies (caskets, burial flags, other mortuary supplies) and services (care of the dead contract) submit to the Bureau the following information on NavSandA 127 in quadruplicate:

a. Name, grade, serial number and organization of decedent.
b. Itemized list of supplies and services furnished,with the cost of each.
c. A certification of receipt of such supplies and services signed by a responsible Army or Air Force officer, as appropriate. C. A. Swanson

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BUMED CIRCULAR LETTER 50-85 7 August 1950

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Indoctrination in the Use of the Ejection Seat; Recording of

1. Entries shall be made on the Aviation Medical Abstract (H-9) in the Health Record of all Navy Aviators and Navy Aviation Pilots completing the indoctrination course in the use of the ejection seat. Entries shall be made in the space provided for altitude training and shall include date, station where indoctrination was given, a statement under remarks that indoctrination course in the use of the ejection seat was completed, and the signature of the medical officer certifying to the correctness of the entry. C. A. Swanson

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BUMED CIRCULAR LETTER 50-86 11 August 1950

From: Chief, Bureau of Medicine and Surgery
To: Ships and Stations Having Medical Department Personnel on Board

Subj: Reporting Requirements; Change in

1. The following changes in the reporting requirements are effective immediately:

(a) Monthly Altitude Training Unit Report, NAVMED-440, (par. 5122, MMD) shall be submitted quarterly rather than monthly.

(b) Monthly Report of Night Vision Training, NAVMED-589, (par. 5123, MMD) shall be submitted quarterly rather than monthly.

(c) Rental Report for Nurses, NAVMED-727 is hereby cancelled.

(d) Transfer of Property Custody, NAVMED-D, (Part VI, MMD) shall continue to be exchanged between the parties concerned. However, the submission of a copy of this form to the Bureau shall be discontinued.

2. Appropriate changes to the Manual of the Medical Department will be made at a later date. C. A. Swanson

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BUMED CIRCULAR LETTER 50-87 11 August 1950

From: Chief, Bureau of Medicine and Surgery
To: Commanding Officers, All Naval Hospitals, Hospital Ships, and Naval Medical Units in Other Military Hospitals

Subj: Neuropsychiatric Report, NavMed-102 (Rev. 3-50); Submission of

Ref: (a) Par. 5118, MMD 1945
(b) BuMed Cir Ltr No. 50-19

1. Reference (a) is hereby cancelled. A new article covering the subject report will appear in the forthcoming chapter 23 of the Manual of the Medical Department. Reference (b) is also cancelled with the exception of enclosure (2) thereto which covers the preparation instructions for the revised report.

2. This report was previously required only from the continental hospitals, however, effective immediately the report will be required also from all naval hospitals, hospital ships, and naval medical units in other military hospitals.

3. The revised printed forms (Neuropsychiatric Report, NavMed-102 (Rev. 3-50)) are now available and should be requisitioned from the appropriate district publications and printing office.

4. In view of the present emergency, weekly reporting is to be continued until further notice. The closing date of each report should be 2400 Saturday of each week. C. A. Swanson.

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NAVY DEPARTMENT
BUREAU OF MEDICINE AND SURGERY
WASHINGTON 25, D. C.

OFFICIAL BUSINESS

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NavMed-369 - 8/50

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